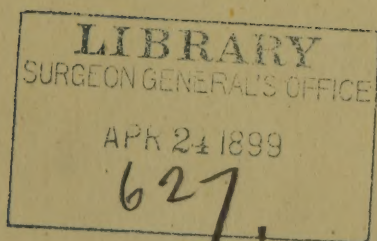


FITCH (A.)

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Eastern New York



*Dr. Schank,
with the respects of the author.*

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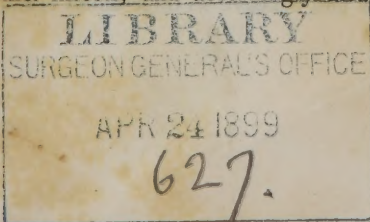
WINTER INSECTS OF EASTERN NEW YORK.

BY ASA FITCH, M. D.

It is the object of the following paper, to describe those insects of Eastern New York, which occur in their perfect state in the winter, and are peculiar to that season and the early part of spring. They are objects of curiosity, as coming forth to our view in full maturity and vigor, at that time in the year when almost every other member of the animal and vegetable kingdoms is reposing in torpidity under the chilling influence of solstitial cold. In an economical aspect, they possess but little importance, their period of life being limited to that season when the field furnishes no herbage, the garden no flowers, and the orchard no fruits, on which they can prey. They are chiefly interesting, therefore, merely as objects of scientific research—as forming integral parts of that vast array of animated beings, with which the Father of Life has populated our world, and rendered it vocal with his praise.

Hence it is to the scientific rather than the agricultural reader, that the following pages are addressed. To him they will be sufficiently intelligible, without such illustrations as have accompanied our previous contributions to this Journal.

A few words respecting the analogies of the two first species here described, may not be devoid of interest to the general reader. A small insect, destitute of wings, and bearing some resemblance to a flea in its general aspect, is found in the winter season, upon the snow in the northern part of Europe, and also occurs upon the Alps and the Hartz mountains. It has been known for nearly a century, and from its singularly anomalous characters, naturalists have been much perplexed to determine in which particular family of the insect tribes it might with the most propriety be placed. Linnæus was the first to classify and name it. He regarded it as possessing more analogies with the species associated in his genus *Paropseus*, than with any other insects, and accordingly arranged



It with them, bestowing upon it the specific name *hyemalis*. But, inasmuch as it differed from the Panorpidæ in some prominent particulars, such as possessing the faculty of leaping, and being furnished with an ovipositor similar to many grasshoppers and crickets, Panzer, at a subsequent day, placed it under the genus *Gryllus*. More recent naturalists, however, have concurred in the propriety of the location originally given by Linnæus, and to obviate, in some degree, the incongruity of its situation, Latreille was induced to construct for it an independent genus, placed beside Panorpa, to which genus he gave the name *Boreus*. The *hyemalis* has remained to this day the sole species of this genus, no other insect having similar characters, having been discovered in any part of the world. Two years since, in the month of March, searching carefully upon the melting snow, to find if possible in this vicinity, a rare and singular insect which has been lately discovered in Canada—the *Chionea valga*, a fly destitute of wings—though unsuccessful, my labors were rewarded with an equally acceptable return, an insect cogenetic with the curious *Boreus hyemalis* of Europe. Since that time, I have met with numerous specimens, and have also found in the same situations, several individuals of a third species pertaining to the same genus. From these specimens I draw the following detailed characters of the

GENUS BOREUS, Latreille.

Polished and shining. *Head* sunk into the thorax to the eyes, which are prominent; ocelli wanting. *Rostrum* long-conical, twice or thrice as long as the head from which it gradually tapers, projecting downwards at right angles with the body, or more or less inclined backwards under the breast, its front side clothed with minute hairs. *Maxillary palpi* reaching beyond the tip of the beak; terminal joint longest and slightly thicker than the others, long ovate; basal joints cylindrical, half as long as they are broad. *Antennæ* inserted in the middle of the front, their bases nearer to the margin of the eyes than to each other, reaching half the length of the abdomen in the females and to its tip in the males, thickly set with very short minute hairs; filiform, hardly thicker towards their tips, composed of twenty-three joints; two basal joints thickest, the first sub-cylindric, the second obovate; succeeding joints short-cylindric, compact; terminal joint ovate. *Thorax* cylindrical, scarcely as broad as the head. *Wings, in the males*, rudimentary and not adapted for flying. Upper pair represented by two coriaceous pseud-elytral scales which reach rather more than half the length of the abdomen; these are broadest at their base and gradually taper to an acute point, the length being over four times as great as the breadth; they are very convex above and concave on their under sides, and thus when detached,

bear some resemblance to the chaff-scale or glume of a small kernel of grain; the apex is armed with a straight thorn-like spine which is directed backwards and downwards; the inner margin is studded with a row of small teeth, which are longer and more distinct towards the apex of the pseud-elytron; these teeth are inclined backwards, and at their points they are strongly curved in the same direction; both the outer and inner margins are minutely ciliated with short hairs. The under wings are represented on each side by a curved bristle which lies under the pseud-elytron and within its concavity; it scarcely exceeds the pseud-elytron in length, is slightly dilated at its base, curves inwards and downwards, is almost hooked at its tip, and gives off an occasional short hair. *In the female* the wings are entirely wanting, the only vestiges of them being two minute scales occupying the place of the upper pair: these scales are circular and scarcely the hundredth part of an inch in diameter in *B. nivoriundus*, slightly elongated and a third smaller in *B. brumalis*; they are convex above and concave beneath, and attached to the thorax by a short broad pedicel; their edges are ciliated with minute hairs; their upper surface is also thickly set with very short, erect hairs, and is crossed by an elevated rib or slight keel. *Legs* long, particularly the posterior pair, the length of which exceeds that of the body; their several joints cylindric and densely clothed with short minute hairs; the first tarsal joint half as long as the tibia, the four remaining joints successively shorter, terminated by two small, slender, simple hooks. *Abdomen* oval, depressed when exsiccated, the segments distinctly marked by strongly impressed transverse lines, and clothed with fine appressed hairs: in the males it is nearly cylindrical, but little broader than the head, truncated as it were at its apex and turned upwards; tip of the last segment furnished with two stout sharp-pointed hooks, each with an acute tooth in the middle of its inner edge, and pilose along its outer edge; these hooks are susceptible of being extended in a line with the body, but are commonly strongly recurved upon the back, shutting down upon and grasping a small scutel-like process which projects upwards at the base of this segment. They are thus recurved in coition, the male organ being exerted from between their bases. *Ovipositor* robust, about half as long as the abdomen of the female, projecting backwards in a line with the body, composed of a three-jointed semicylindrical piece above, and two ligulate valves below; the latter have their lower edges held in contact, thus forming a little gutter, and on the under-side towards their tips they are finely serrated; of the upper piece, the middle joint is much the longest, and is lined beneath on its concave side with a membrane which becomes distended with fluid when the abdomen is pressed upon; the short terminal joint is susceptible of being in-

clined obliquely downwards, thus, at least partially, closing the end of the ovipositor; the upper and lower pieces are widely separated in coition to enable the tip of the male abdomen to approximate that of the female.

1. *BOREUS NIVORIUNDUS.* *The Snow-born Boreus.*

Shining black or brownish-black; rudimentary wings, thorax above, with the rostrum and ovipositor excepting their tips, fulvous; legs dull fulvous.

Length, male twelve-hundredths of an inch; female, 0.15, or including the ovipositor 0.18.

Head black, highly polished, glabrous. *Eyes* black. *Rostrum* fulvous and feebly diaphanous, the mouth and palpi black. *Antennæ* black, two basal joints sometimes fulvous-brown. *Thorax* black on the sides, above varying in color from dull fulvous to cinnamon yellow, the basal half of the prothorax being black. *Abdomen* black, brownish black, or dull fulvous-brown; terminal segment fulvous or cinnamon-yellow, its hooks in the males cinnamon-yellow, their tips and teeth black and highly polished; ovipositor in the females diaphanous, fulvous, sometimes inclining to rufous, black at its tip. Rudimentary *wings* cinnamon-yellow, in the males often of a duller hue towards their tips; rudimentary inferior wings in the males of the same color as the superior. *Legs* lurid-yellow and sub-diaphanous, with a slender black annulus at each of their articulations; three last joints of the tarsi wholly black.

Closely allied to the *B. hyemalis*, which, however, appears from Rambur's Neuroptera, the Penny Cyclopædia, and the beautiful colored figure in Westwood's Introduction, the only definite authorities to which I am able to refer, to have the basal two-thirds of the antennæ of a russet color, and the rudimentary wings and the legs strongly inclining to red. Our species presents no tinge of rufous, except sometimes in the ovipositor; and the antennæ, black to their bases, is a decided distinctive mark.

This insect is by no means rare, being found upon the snow in forests in warm days, so early as December, and becoming more common as the season advances. I have met with it the most plentiful in April, when there has been a fall of snow in the night, succeeded by a warm forenoon of bright sunshine. Appearing so suddenly, in numbers, upon the clean, dazzling white surface thus spread over the earth, at the first thought it seems to be literally bred from the snow. I have not yet searched for it in the moss of tree-trunks, but doubt not that like the European insect, ours will also occur in this situation. When observed upon the snow, it is almost always stationary; and when approached by the hand, it commonly makes a leap, to the distance of a few inches only, its saltatory powers appearing but feeble.

2. *BOREUS BRUMALIS.* *The Mid-winter Boreus.*

Polished deep black-green; legs, antennæ, rostrum, and ovipositor black; rudimentary wings brownish-black.

Length, male 0.10; female 0.12, or including the ovipositor 0.15.

This species presents no very obvious characters beyond those already given. Its body is highly polished, shining even with a metallic lustre, whilst the eyes, antennæ, rostrum, and legs, reflect the light but feebly. The ovipositor is pure black, but equally splendid with the black-green abdomen. The scales which occupy the place of the wings in the females are but faintly perceptible, appearing like two minute greyish-black spots on the thorax. In the living insect, there is a light fulvous vitta, obvious to the naked eye, along each side of the abdomen, at the lateral suture; this is frequently obliterated or but imperfectly discernible in the dried specimen.

So far as I have at present observed, this appears abroad earlier in the season, and in colder weather than the preceding, though occasionally found associated with it on the last snows that fall in the spring. It is much less common than the other.

3. *PERLA NIVICOLA.* *The Small "Snow-fly."*

Black; wings grey, unclouded, a third shorter than the abdomen in the males, a third longer in the females.

Length 0.20, wings expand 0.45; males smaller.

Head shining, clothed with very short, fine hairs. *Palpi* brownish-black, sub-diaphanous. *Antennæ* reaching half the length of the wings, black, setaceous, about thirty-jointed; joints obconic, basal one largest. *Prothorax* flattened, its margins more smooth and shining, its disk rugulose, with a few shallow impressions; an impressed transverse line near the base and another near the apex. *Abdomen* shining, with a broad pale fulvous dorsal vitta which does not extend onto the two last segments; venter with a tint of obscure pallid at base. *Setæ* as long as the abdomen, black, setaceous, clothed with short whitish hairs; joints from thirteen to about eighteen in number, obconic, gradually shorter towards the base. *Legs* black, joints cylindric. *Tibiæ* obscure pale brown except at the tips, sub-diaphanous, grooved longitudinally. *Tarsi*, basal joint longest, second joint very short. *Wings* reaching half the length of the setæ, finely ciliated at their tips and along their inner margins; grey, diaphanous, immaculate; nervures black, robust, and very strongly marked, particularly on the upper pair which have five closed cells in the disk. The male is smaller, with the wings reaching but two thirds the length of the abdomen, its palpi and entire tergum black, and the tibiæ darker than in the female.

On warm days in the latter half of winter this species may be observed crawling with hurried steps upon the snow. It becomes most numerous about the time the snow finally disappears, and is then often seen on shrubs, fences, and buildings, and not unfrequently finds its way into our houses. It is extremely common, occurring most abundantly in the vicinity of streams of water, in which element the previous stages of its existence are passed. When first excluded from its pupa state, it is of a pale yellowish color, but gradually changes to black, this change commencing upon the thorax. Copulation occurs immediately after the female comes from the pupa state.

4. NEMOURA NIVALIS. *The Large "Snow-fly." The "Shad-fly."*

Black; wings griseous, faintly banded, double the length of the abdomen.

Length, males somewhat under, females over half an inch; wings expand about an inch.

Head covered with minute whitish hairs, which are longer and more obvious beneath the bases of the antennæ and around the mouth. Vertex with an obtusely impressed transverse line immediately back of the two posterior stemmata, and a longitudinal medial one, reaching from the former to the neck. Antennæ black, clothed with very short minute hairs, slender, setaceous, as long as to the tips of the wings in the males and somewhat shorter in the females, composed of about sixty joints; basal joint short-cylindrical, its diameter double that of the third and following joints; second joint intermediate between the first and third in diameter, its length and breadth about equal; the remaining joints obconic, gradually diminishing in diameter and increasing in length toward the tips. Palpi clothed with very short, minute hairs, black; basal joints of the maxillaries lurid and slightly diaphanous, penultimate joint rather the shortest and obconic, the joint preceding it longest and obconic, the terminal joint oval, and scarcely as thick as the others. *Prothorax* square, in the females scarcely broader than it is long, somewhat narrower anteriorly, posterior angles rounded, all the margins slightly and obtusely elevated, the posterior one more obviously so, often with a dull fulvous spot at the base, or with this color spread over the posterior part of the raised margin, and more rarely a similar spot at the middle of the apex; disk sometimes showing an impressed transverse line, and a longitudinal dorsal stria. Exposed portion of the *mesothorax* much elevated above the plane of the prothorax, forming a transverse ridge between the bases of the wings; clothed with short hairs; often with traces of dull fulvous around the wing-sockets; the portion of the mesothorax and metathorax covered by the wings smooth and shining. *Abdomen*

reaching but half the length of the wings; sutures of the tergum in the female more or less widely marked with dull rufous; tip, in the female only, furnished with two short, filiform setæ, scarcely equalling in length the segment to which they are attached; setæ pale lurid, sub-diaphanous, hairy, composed of about eight joints. Each segment of the venter with two transverse impressions, one situated towards each posterior angle. Male organ exerted, forming a conical lurid point near the base of the last ventral segment. *Femurs* cylindrical, black, clothed with white hairs, which are longer and more distinct in the females, inner side with a narrow deep groove which is dilated towards the apex. *Tibiæ* cylindrical, about half the diameter of the femurs, grooved, lurid-brown, diaphanous, the ends and inner sides black; apex slightly incurved and armed with two short spines on the inside. *Tarsi* black, composed of three joints, whereof the middle one is slightly shorter; two claws and an intervening pellet at the tips. *Wings* griseous, when closed showing faintly two paler bands, one near the middle and the other back of it; edges ciliated with fine, short hairs. Upper wings diaphanous, grey, faintly marked with a darker cloud back of the middle, and another occupying the tips, but not reaching to the edge, these clouds becoming wholly obliterated in cabinet specimens; nervures black. Lower wings grey, sub-hyaline, nervures black.

When recently excluded from the pupa, the abdomen, except at its tip, is of a dull rufous color; this gradually becomes darker, and finally pure black. For a time after the venter has become wholly black the tergum continues dull rufous with a black band on each segment, which band does not reach the lateral margins. These bands increase in size, and at length the whole tergum is overspread with pure black.

It is not uncommon to meet with specimens of this and the preceding species, infested with a minute parasite of the family Acaridæ. These parasites are of a bright vermilion-red color, and fix themselves, one or more, at the sutures of the tergum, not quitting their hold after the death of the insect, unless disturbed.

This species begins to appear, soon after the Small Snow-fly is first met with. It occurs in the same situations, is nearly as abundant, and remains for a time after that has disappeared. One of the purposes served by these prolific insects in the economy of nature, doubtless is, to supply with food the fish of our streams, at this early period of the year. The larger of these species, continuing to be abundant when the shad first come into our rivers, has evidently received one of its popular designations in allusion to this fact.

We regard this as the American analogue of the European *Nemoura nebulosa*, Linn. But, from several points in the extend-

